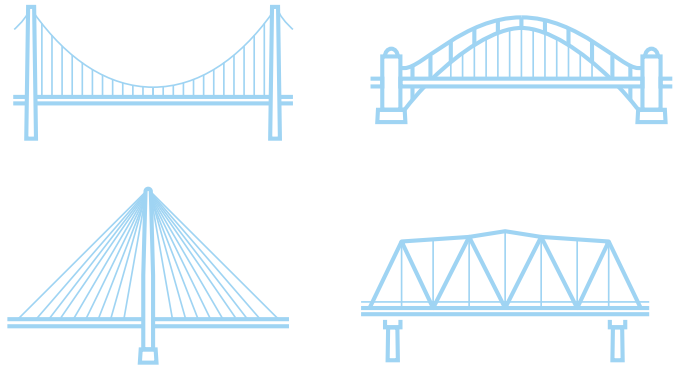


Bridge building challenge



A step-by-step guide to creating your own bridge. Get your family or friends to build a bridge and see what designs are most successful.

On Sydney's Metro North West Line, we have a new bridge over Windsor Road at Rouse Hill. Similar in design to the Anzac Bridge, the Windsor Road bridge is the first cable-stayed railway bridge built on a curve in Australia.

Getting started

Materials

- Pen and paper (or you can use the design template)
- Art and craft supplies (e.g., coloured paper, cardboard tubes, scissors, tape, pens, pencils, pipe cleaners, pop-sticks, egg cartons, modelling clay, plasticine, craft sticks/dowels, string/wool, paper cups, foil, possibilities are endless.)
- Coins or masses to act as weights to test your bridge's load capacity
- Set aside a table or level surface where you can construct your bridge.

Make sure you have at least two hours (or more!) to:

- Research the type of bridge you want to build
- Design, construct and test your bridge

Your mission

Design and build your own railway bridge that allows a metro train to cross it. Remember, when designing and constructing your prototype your bridge should be wide enough for two model trains to cross in either direction and strong enough to support the weight. Explore the different shapes used in bridge design and use a variety of craft materials to construct your bridge.

A step-by-step guide

1 Resources

Bridges come in all shapes and sizes. Using your worksheet, explore the five types of bridge designs.

Write down three features for each type of bridge

Quick tips

Examples:

- What shapes can be found on these bridges?
- Why do you think they use these shapes?
- What materials can be used for different parts of a bridge?
- Where do you usually see these types of bridges?

3 Design your own bridge

Draw a design of your bridge.

In your design include notes on:

- Materials you plan to use
- What are the main shapes used in your design?
- How your bridge will be supported?
- How much load/weight will your bridge support?
- How your bridge will fit in with the local environment (consider your community, the natural environment such as trees and wildlife, other buildings and houses, roads, parks and or waterways).
- Safety features

5 Testing

Now it's time to put your bridge to the test...

Test the strength and form of your bridge by using coins or other small items.

- How much weight can your bridge hold?
- Does the shape of your bridge hold up or does it collapse?
- What can you do to strengthen and support your bridge?

Quick tips

Some shapes are stronger than others. Test the different shapes and see how they support your bridge structure.

2 Get inspired

Ask your parent's permission to access the internet to see how we built Sydney Metro's Windsor Road Bridge

<https://www.youtube.com/watch?v=Wyl-DAhHhQ>

Take no more than 30-45 minutes to visit **Google Earth** for a virtual tour of 12 renowned bridges around the world.

Extension work:

- What are the names of these 12 bridges?
- What are they made of? Why do you think they used these materials?
- Take a "street view" (click on the yellow icon) for a closer look to see how this bridge is being used.
- What shapes can you see in the design of the bridge?
- Why do you think they used this design?

4 Construct your bridge

Using your craft materials refer to your design and start building your bridge. Remember, the materials you use are important but so are the SHAPES that support your bridge. Which shapes are the most supportive?

Quick tips

Before you start find a level surface or table and check with your parent/guardian it is ok to use the materials you have chosen.

Challenge – Give yourself a set time limit of one or two hours and see what you can achieve in that time.





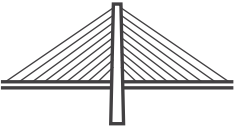





6 Have fun and share it with others

Take a photo or video of your bridge. Don't forget to show its features.

Now it's time to share it with family and friends. Maybe you can inspire them to create their own bridge?

Make sure you send us a copy or link at sydneymetroedu@transport.nsw.gov.au so we can see your creation.

Bridge building challenge worksheet

Types of bridges	Example	List three features of these bridges
<p>Arch bridge</p> 	<p>Sydney Harbour Bridge</p> 	<p>1. _____</p> <p>2. _____</p> <p>3. _____</p>
<p>Beam bridge</p> 	<p>Captain Cooks Bridge</p> 	<p>1. _____</p> <p>2. _____</p> <p>3. _____</p>
<p>Cable stayed bridge</p> 	<p>Windsor Road Bridge</p> 	<p>1. _____</p> <p>2. _____</p> <p>3. _____</p>
<p>Suspension bridge</p> 	<p>Golden Gate Bridge</p> 	<p>1. _____</p> <p>2. _____</p> <p>3. _____</p>
<p>Truss bridge</p> 	<p>Iron Cove Bridge</p> 	<p>1. _____</p> <p>2. _____</p> <p>3. _____</p>

My bridge design

